

# Projects:

## Bats: Ecologically Important Mammals

[http://www.endangered-species-handbook.org/projects\\_bats.php](http://www.endangered-species-handbook.org/projects_bats.php)

### Project Summary

Learning about bats and threats to them is the major purpose of this project, as well as understanding the importance of bats to the environment as pollinators, seed dispersers and insect-eaters. An endangered bat species will be selected as the subject of a report. Conservation of bats through the protection of their habitats and building of bat houses will be an important facet of this project.

### Background

Bats comprise almost one-fourth of all mammals--nearly 1,000 species--yet they have not received the attention and credit they deserve as major insect-controllers and pollinators in ecosystems worldwide. Many species are becoming endangered, and others are declining from destruction of their nesting caves, direct persecution from ignorance, closure of mines which many bats had colonized, and indiscriminate use of pesticides.

Until recently, bats were routinely poisoned by commercial pest control companies in the mistaken idea that all bats pose the threat of rabies transmission. Only one-half of 1 percent of bats contract rabies. Over the past 45 years, only 20 people in the United States and Canada have contracted the disease from bats, according to Bat Conservation International, an organization dedicated to the conservation of bats and education about their ecological roles. Most problems involve people carelessly picking up obviously sick bats found out in the open or on the ground in the daytime. These should always be avoided, according to Dr. Merlin D. Tuttle, Founder and Executive Director of Bat Conservation International. Pest control companies in the United States are now adopting new and more informed policies regarding the removal of unwanted bats from buildings. The journal *Pest Management*, in its May 1992 edition, published several articles on how to "bat-proof" buildings without use of lethal means, and the usefulness of bats in controlling insects.

A single Brown Bat, one of North America's most common species, is capable of capturing 600 mosquitoes in an hour (see Tuttle and Smith referenced below). One colony of 20 million Mexican Free-tailed Bats in central Texas eats a quarter of a million pounds or more of insects each night, according to Bat Conservation International. Repercussions have occurred when bats have been destroyed. In Israel, a campaign to eradicate fruit bats instead killed almost 90 percent of the country's insectivorous bats; moths that were formerly controlled by the bats proliferated and became major agricultural pests (Tuttle and Smith). To control these pests, huge amounts of pesticides were used, further eliminating natural predators of insects and beneficial insects.

Nectar-feeding and fruit bats pollinate more than 130 genera of plants. The co-evolution of many bats and plants, the latter evolving prominent, odoriferous large flowers blooming at night with copious nectar and pollen, and the former specialized tongues and muzzles for flower-feeding and acute senses of sight and smell, is a fascinating study in itself. The statuesque Century Plant of southwestern deserts has co-evolved with a pollinating bat, and this plant blooms at rare intervals, using nectar to attract its pollinator (see Howell referenced below). Among plants that bats pollinate are valuable fruits, nuts and spices: plantain, bananas, breadfruit, mangos, guavas, avocados, almonds, cashews, cloves, vanillin, carob and figs. In Southeast Asia, a bat that pollinates the Durian tree, which produces fruit marketed for \$120 million per year, is being killed for food and its caves quarried for limestone. Few people in the region are aware of its economic importance and the need to conserve it. Fruit bats throughout the world are killed for food, and a growing number are becoming endangered.

Many US bats are listed on the US Endangered Species Act as Endangered or Threatened or on the *2000 IUCN Red List of Threatened Species*. The Indiana Bat's entire population winters in only a few caves in the United States. Approximately 95 percent of the entire known Gray Bat population hibernates in only nine caves with more than half

in a single cave in northern Alabama. The threatened Rafinesques Big-eared Bat is found only in Indiana, but it receives no federal protection from the US Endangered Species Act. The Nature Conservancy and many state Natural Heritage Programs have been instrumental in purchasing numerous caves to protect these species.

The following bats are either listed on the US Endangered Species Act or on the *2000 IUCN Red List of Threatened Species*. Some experts estimate that approximately 40 percent of US bats are declining or already endangered. Many species recognized by mammalogists as threatened or endangered and listed by the IUCN as Vulnerable, a high category of risk, have not been listed on the US Endangered Species Act.

### Threatened United States Bats

(Includes territories)

Key:

E = Endangered

NT = Near Threatened

T = Threatened

V = Vulnerable

X = Extinct

For definitions of these categories, see the list of Endangered and Threatened Mammals, Birds, Reptiles and Amphibians in the Appendix of this book.

Species	Distribution	US ESA	IUCN Red List
Big Long-nosed Bat <i>Leptonycteris nivalis</i>	US, Mexico, Guatemala	E	E
Brazilian Free-tailed Bat <i>Tadarida brasiliensis</i>	sw US to S. America		NT
California Leaf-nosed Bat <i>Macrotus californicus</i>	US, Mexico		V
Gray Bat <i>Myotis grisecens</i>	c. & se US	E	E
Hairy-legged Vampire Bat <i>Diphylla ecaudata</i>	US, Mexico to Peru		NT
Hawaiian Hoary Bat <i>Lasiurus cinereus semotus</i>	US (Hawaii)	E	
Hog-nosed Bat <i>Choeronycteris mexicana</i>	US, Mexico, C. America		NT
Indiana Bat <i>Myotis sodalis</i>	e. & Midwest US	E	E
Lesser Long-nosed Bat <i>Leptonycteris curasoae</i>	US to S. America		V
Sanborn's <i>L.c. yerbabuena</i>		E	
Little Mariana Flying Fox <i>Pteropus tokudae</i>	Guam	E	X

Marianas Flying-fox <i>Pteropus mariannus</i>	SW Pacific	E
Guam <i>P.m.mariannus</i>		E
Mexican Long-nosed Bat, see Big Long-nosed Bat		
Rafinesque's Big-eared Bat <i>Plecotus rafinesquii</i>	US (Indiana)	V
Townsend's Big-eared Bat <i>Plecotus townsendii</i>	US	V
Ozark <i>Plecotus townsendii ingens</i>		E
Virginia <i>Plecotus townsendii virginia</i>		E
Underwood's Mastiff Bat <i>Eumops underwoodi</i>	US to Central America	NT

In addition, each state Natural Heritage Program has a list of threatened or rare mammals, many of which include bats. The major threats to bats in North America are similar to those in foreign countries. They include the cutting of old-growth forests that provide habitat, pesticide use, deliberate poisoning and destruction of caves where many bats winter.

### Activities

- o Find out which bats live in your area. For distribution information, consult guide books such as *North American Mammals*, published by the National Audubon Society. Use reference books such as *Bats*, by M. Brock Fenton (1992), *America's Neighborhood Bats*, by Merlin D. Tuttle (1988), and *Walker's Mammals of the World*, by Ronald Nowak. Bat Conservation International has published a beautiful brochure, "Bats: Gentle Friends, Essential Allies," and a fact sheet, "Important Bat Facts." Different species of bats can occupy the same general area, yet have different diets and habitats. How do the bats in your area differ in these ways? What do they eat? Contact the Natural Heritage Program of your state and ask them if there are important bat habitats, such as caves, that are endangered and how your class or local organization can help save these habitats.
- o Select a threatened species of bat and write a report on its status, life history, threats and what is being done for its conservation. Consult the references below and your state's Natural Heritage Program.
- o Discuss the ecological importance of bats. What fruits and other plants important to humans are pollinated by bats? What would be the effect on insect populations if bats disappeared? *Bats in Question*, by Don E. Wilson, listed below, is a very useful book for information on this subject.
- o Help dispel the image of bats as dangerous, rabid creatures who should be eliminated. Humane means of keeping bats from entering buildings exist, and local animal control officials and public health officials should be provided with such information, available from Bat Conservation International. Also, letters to the editor of your local newspaper can be helpful, especially if an article about rabies or vampire bats has been printed. Point out that bats are extremely beneficial and vital to the survival of many plants.
- o Build a bat house as a class project. The instructions for construction and placement are given in "The Bat House Builder's Handbook" from Bat Conservation International and a video that gives instructions and general information. This pattern prevents mortality to bats from improper design, materials and placement. Once constructed, calculate

the number and species of bats that will occupy the house(s) and the number of insects they will consume.

o Bats have many highly unusual characteristics. Many have echo-location sonar far more sensitive than that designed by humans. Others are able to hunt unusual prey, such as fish or frogs. Their abilities are so finely developed that they are only beginning to be understood. They also are intelligent and devoted to one another. They are among the few species who aid one another during the birthing process, as "animal midwives." Consult the books and films listed below and write a paper on a particular trait that you find fascinating.

### **Books and Publications**

Allen, Glover M. 1962. *Bats*. Dover Publications, New York.

Fenton, M. Brock. 1992. *Bats*. Facts on File, New York.

Fenton, M. Brock. 1998. *The Bat. Wings in the Night Sky*. Firefly Books, New York.

Howell, Donna J. 1976. Plant-loving Bats, Bat-loving Plants. *Natural History* (magazine of the American Museum of Natural History, New York), Feb.

Nowak, Ronald M. 1999. *Walker's Mammals of the World* (Volume I), Johns Hopkins University Press, Baltimore, MD. (*Walker's Bats of the World*, another reference by the same author, is derived from the latter volume.)

Tuttle, Merlin D. 1988. *America's Neighborhood Bats*. University of Texas Press, Austin, TX.

Tuttle, Merlin D. and Eileen C. Smith. 1992. Bats: Nature's Own PCO. *Pest Management*, May, Vol. 11, No. 5, pages 10-13.

Wilson, Don E. 1997. *Bats in Question. The Smithsonian Answer Book*. Smithsonian Institution Press, Washington, DC. (Source book with questions and answers about bats and superb photography by Merlin D. Tuttle; addresses of organizations concerned with bat conservation are listed at the end of the book along with a list of all bats with their conservation status.)

### **Films**

"Korup. An African Rain Forest." A Cameroon forest where bats are seen pollinating flowers at night.

"The Secret World of Bats." Overall view with the role of bats as pollinators and insect-eaters is stressed, and unusual species, such as fish-eating and threatened fruit bats, are seen.

"Wet Side Story." Central American rainforest with bats as a focal point. The sensitivity of their sonar is beautifully filmed.

"Private Life of Plants." Includes pollination by bats of several species of plants and describes how plants and bats co-evolved.

"Castaways of Sulawesi." An Indonesian island is the scene of cruel capture of flying foxes for sale as food by young boys using hooks on kites that entangle them in flight.

The films above are described in detail in the Video section of this book.

In addition, other films that focus on bats include "Phantom of the Night" (bats of Central America); "Beneficial Bats" (Wild America series); "Land of the Giant Bats" (Comoros flying foxes); "Life Upside Down" (Quebec Government film emphasizing Canadian bats and their ecological role); "Night Stalkers" (bats of Belize--National Geographic Explorer TV program).

### **Slide Show**

"Bats of America," by Bat Conservation International.

**Further Information**

Bat Conservation International, P.O. Box 162603, Austin, TX 78716; website:  
[www.batcom.org](http://www.batcom.org)

US Fish and Wildlife Service, Office of Endangered Species, Washington, DC  
20240

State Natural Heritage Programs

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